

- 1 1. A method for optimizing a wireless electromagnetic communications network,
2 comprising:
3 a wireless electromagnetic communications network, comprising
4 a set of nodes, said set of nodes further comprising,
5 at least a first subset wherein each node is MIMO-capable,
6 comprising:
7 an antennae array of M antennae, where $M \geq$ one,
8 a transceiver for each antenna in said spatially diverse
9 antennae array,
10 means for digital signal processing to convert analog radio
11 signals into digital signals and digital signals into analog
12 radio signals,
13 means for coding and decoding data, symbols, and control
14 information into and from digital signals,
15 diversity capability means for transmission and reception of
16 said analog radio signals,
17 and,
18 means for input and output from and to a non-radio
19 interface for digital signals;
20 said set of nodes being deployed according to design rules that prefer
21 meeting the following criteria:
22 said set of nodes further comprising two or more proper subsets of
23 nodes, with a first proper subset being the transmit uplink / receive
24 downlink set, and a second proper subset being the transmit
25 downlink / receive uplink set;
26 each node in said set of nodes belonging to no more transmitting
27 uplink or receiving uplink subsets than it has diversity capability
28 means;
29 each node in a transmit uplink / receive downlink subset has no
30 more nodes with which it will hold time and frequency coincident

1 communications in its field of view, than it has diversity
2 capability;
3 each node in a transmit downlink / receive uplink subset has no
4 more nodes with which it will hold time and frequency coincident
5 communications in its field of view, than it has diversity
6 capability;
7 each member of a transmit uplink / receive downlink subset cannot
8 hold time and frequency coincident communications with any
9 other member of that transmit uplink / receive downlink subset;
10 and,
11 each member of a transmit downlink / receive uplink subset cannot
12 hold time and frequency coincident communications with any
13 other member of that transmit downlink / receive uplink subset;
14 transmitting, in said wireless electromagnetic communications network,
15 independent information from each node belonging to a first proper subset, to one
16 or more receiving nodes belonging to a second proper subset that are viewable
17 from the transmitting node;
18 processing independently, in said wireless electromagnetic communications
19 network, at each receiving node belonging to said second proper subset,
20 information transmitted from one or more nodes belonging to said first proper
21 subset;
22 and,
23 dynamically adapting the diversity capability means and said proper subsets to
24 optimize said network.
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27 2. A method for optimizing a wireless electromagnetic communications network,
28 comprising:
29 a wireless electromagnetic communications network, comprising
30 a set of nodes, said set of nodes further comprising,

1 at least a first subset wherein each node is MIMO-capable,
2 comprising:
3 a spatially diverse antennae array of M antennae, where M
4 \geq two,
5 a transceiver for each antenna in said spatially diverse
6 antennae array,
7 means for digital signal processing to convert analog radio
8 signals into digital signals and digital signals into analog
9 radio signals,
10 means for coding and decoding data, symbols, and control
11 information into and from digital signals,
12 diversity capability means for transmission and reception of
13 said analog radiosignals,
14 and,
15 means for input and output from and to a non-radio
16 interface for digital signals;
17 said set of nodes being deployed according to design rules that prefer
18 meeting the following criteria:
19 said set of nodes further comprising two or more proper subsets of
20 nodes, with a first proper subset being the transmit uplink / receive
21 downlink set, and a second proper subset being the transmit
22 downlink / receive uplink set;
23 each node in said set of nodes belonging to no more transmitting
24 uplink or receiving uplink subsets than it has diversity capability
25 means;
26 each node in a transmit uplink / receive downlink subset has no
27 more nodes with which it will hold time and frequency coincident
28 communications in its field of view, than it has diversity
29 capability;
30 each node in a transmit downlink / receive uplink subset has no
31 more nodes with which it will hold time and frequency coincident

1 communications in its field of view, than it has diversity
2 capability;
3 each member of a transmit uplink / receive downlink subset cannot
4 hold time and frequency coincident communications with any
5 other member of that transmit uplink / receive downlink subset;
6 and,
7 each member of a transmit downlink / receive uplink subset cannot
8 hold time and frequency coincident communications with any
9 other member of that transmit downlink / receive uplink subset;
10 transmitting, in said wireless electromagnetic communications network,
11 independent information from each node belonging to a first proper subset, to one
12 or more receiving nodes belonging to a second proper subset that are viewable
13 from the transmitting node;
14 processing independently, in said wireless electromagnetic communications
15 network, at each receiving node belonging to said second proper subset,
16 information transmitted from one or more nodes belonging to said first proper
17 subset;
18 and,
19 dynamically adapting the diversity capability means and said proper subsets to
20 optimize said network.

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24 3. A method as in claim 1, wherein dynamically adapting the diversity channels and
25 said proper subsets to optimize said network further comprises:

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27 using substantive null steering to minimize SINR between nodes transmitting and
28 receiving information.

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30 4. A method as in claim 1, wherein dynamically adapting the diversity channels and
31 said proper subsets to optimize said network further comprises: